

71-20 Highway Safety Literature

An Announcement
of Recent Acquisitions. . .

HSL No. 71-20
July 16, 1971



THIS ISSUE CONTAINS:

HS-009 279 - HS-009 377
HS-600 468
HS-800 465 - HS-800 466
HS-800 473
HS-800 495

U.S. Department of Transportation / National Highway Traffic Safety Administration

HSL 71-20 July 16, 1971

HS-009 279 - HS-009 377; HS-600 468; HS-800 465 - HS-800 466; HS-800 473; HS-800 495.

Published Bi-Weekly (26 times a year) by the National Highway Traffic Safety Administration

Washington, D. C. 20591

INTRODUCTION

Publications announced in *Highway Safety Literature* include the most recent additions to the collection of the NHTSA Scientific & Technical Information Service. Subject areas covered include all phases of highway, motor vehicle, and traffic safety, especially those encompassed by the National Traffic and Motor Vehicle Safety Act of 1966 and the Highway Safety Act of 1966.

Individual issues of *HSL* are numbered according to the year and the issue number within that year; thus, 71 designates the year and 1, 2, 3, etc. the individual issues. To aid the user in location citations by the HS-number, the cover bears the inclusive entry numbers for each issue.

Entries in *HSL* are arranged according to the revised NHTSA Subject Category List shown in the Table of Contents. The List is a two-level arrangement consisting of five major subject fields subdivided into 58 subject groups. Documents related directly to the National Highway Traffic Safety

Administration (NHTSA) are announced in a separate section headed NHTSA DOCUMENTS and are numbered in five distinct series: NHTSA Accident Investigation Reports (HS-600 000 series), NHTSA Compliance Test Reports (HS-600 000 series), NHTSA Contractors Reports (HS-800 000 series), NHTSA Staff Speeches, Papers, etc. (HS-810 000 series), and NHTSA Imprints (HS-820 000 series). For NHTSA DOCUMENTS in series HS-600 000 and HS-610 000, individual full case reports are available for inspection at the National Highway Traffic Safety Administration; or for purchase from NTIS (see page ii). Although announced together in a separate section, these documents are also assigned specific subject categories for machine retrieval.

A document which contains a number of separate articles is announced as a complete volume in the subject category most applicable to it as a whole. Entries for the individual articles appear in their most specific subject category.

SAMPLE ENTRIES

Subject Category Array —————

NHSB Accession no. HS-800 218 Fld. 5/21; 5/9

Title of document..... AN INVESTIGATION OF USED CAR SAFETY STANDARDS-SAFETY INDEX: FINAL REPORT. VOL. 6 - APPENDICES G-L

Personal author(s)..... by E. N. Wells; J. P. Fitzmaurice; C. E. Guiliams; S. R. Kalin; P. D. Williams

Corporate author Operations Research, Inc.

Collation —————

Publication date..... 12 Sep 1969 150p
Contract FH-11-6921
Report no. ORI-TR-553-Vol-6; PB-190 523

Abstract..... Appendices G-L to this study of used car safety standards include: indenture model diagrams for classes I-IV motor trucks; degradation, wear, and failure data for motor truck classes I-IV; and safety index tables for classes I-IV motor trucks.

Search terms: Wear /Trucks;
Failures /Trucks; Used cars; Inspection standards /Trucks; Inspection standards /Data

HS-004 497 Fld. 5/19

AUTO THEFT—THE PROBLEM AND THE CHALLENGE

by Thomas A. Williams, Sr.

Journal citation . . . Published in *FBI Law Enforcement Bulletin* v37 n12 p15-7 (Dec 1968)

Gives figures on the extent of the auto theft problem and comments on antitheft devices available now or in the planning stage.

Search terms: Theft, Theft protection, Stolen cars

AVAILABILITY: NTIS

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NOTE: Material published in Highway Safety Literature (HSL) is intended for the information and assistance of the motor vehicle and highway safety community. While brands names, equipment model names and identification, and companies may be mentioned from time to time, this data is included as an information service. Inclusion of this information in the HSL should not, under any circumstances, be construed as an endorsement or an approval by the U. S. Department of Transportation, National Highway Traffic Safety Administration of any particular product, course, or equipment.

Harry A. Feinberg
Managing Editor

INSTRUCTIONS FOR ORDERING

Department of Transportation personnel may borrow copies of publications directly from the NHTSA. Outside the Washington, D.C. area, phone (202) 426-2768. In Washington, D.C. area, use government ID, phone 118-62768. Non-DOT personnel should contact their company or agency libraries for assistance.

Journals cited may be obtained through most research libraries.

Contractors' reports and other documents can usually be obtained as indicated under AVAILABILITY. However, there is no certainty that retention copies will be available for more than a limited period after a document is issued.

The more common distribution sources are identified by symbols which are explained below:

NTIS: National Technical Information Service, Springfield, Va. 22151. *Order by accession number: HS, AD, or PB.* Prepayment is required by NTIS (CFSTI) coupon (GPO coupons are not acceptable), check, or money order (made payable to the NTIS), *HC* (Paper copy; full size original or reduced facsimile) \$3.00 up; *MF* (microfiche approximately 4x6" negative sheet

film; reader required) \$0.95.

GPO: Superintendent of Documents, U.S. Government Printing Office, Washington, D. C. 20402. Give corporate author, title, personal author, and report number. Prepayment is required by GPO coupon (NTIS [CFSTI] coupons are not acceptable), check or money order (made payable to the Superintendent of documents).

HRB: Highway Research Board, National Academy of Sciences, 2101 Constitution Ave., N. W., Washington, D. C. 20418.

NHTSA: National Highway Traffic Safety Administration General Services Division, Washington, D.C. 20591 (Telephone (202) 426-0874),

SAE: Society of Automotive Engineers, Dept. HSL, 2 Pennsylvania Plaza, New York, N.Y. 10001. Order by SAE report numbers. Prices given are list; discounts are available to members and sometimes to libraries and U. S. Government Agencies. Prepayment is required; orders without payment are subject to a \$1 handling charge.

IMPORTANT NOTICE

WHEN REQUESTING a document, to be absolutely sure you receive what you order, give the accession number (HS, PB, AD number) or report number (in cases such as an SAE document), title of report, and the personal or corporate author (whichever is cited). When requesting an HS-numbered document from NTIS (CFSTI), add DOT/to the prefix HS-; example HS-800 000 should be ordered as DOT/HS-800 000.

HS-009 279 Fld. 1/1; 4/1; 5/2; 5/20; 3/6

**CANADA SAFETY COUNCIL.
PROCEEDINGS OF THE 1ST
CONFERENCE, OTTAWA, May
4-7, 1969.**

Canada Safety Council

1969 200p

The Canada Safety Council is the result of a merger of the Canadian Hwy. Safety Council, the National Safety League of Canada, and the Canadian Industrial Safety Assoc. Includes HS-009 280 - HS-009 283; HS-009 287; HS-009 288; HS-009 300; HS-009 311 - HS-009 313; HS-009 326; HS-009 335 - HS-009 339; HS-009 345 - HS-009 350; HS-009 371 - HS-009 373.

Papers were presented on the following subjects: medical aspects of safety; uniform traffic legislation; school bus safety; snowmobiling; communication; defensive driving; traffic accidents; hearing conservation; and home safety. The twenty six films shown at the conference are listed.

Search terms: Emergency medical services; Uniform vehicle code; Traffic laws; Uniformity; School bus safety; Snowmobiles; Safety; Defensive driving; Traffic accidents; Hearing; Noise control; Motion pictures; Public relations

HS-009 280 Fld. 1/1

**TRANSPORT OF THE SICK AND
INJURED BY AIR**

by R. F. Thatcher

Canada Air Transport Command

Published in HS-009 279; *Canada Safety*

Presented at First Conference of the Canada Safety Council, Ottawa, 5-7 May 1969.

The role the Canadian Forces plays in the transport of the sick and injured on the west coast of Canada is presented. The operation is the responsibility of the Air Transport Command. Their mode of operation, their equipment, preparation of patients for transport, and problems which arise in the air are described.

Search terms: Canada; Emergency medical services; Aircraft evacuation; Helicopter ambulances; First aid equipment; First aid

HS-009 281 Fld. 1/1

**BRIDGING THE GAPS IN EF-
FECTIVE MEDICAL CARE. THE
ONTARIO AMBULANCE SER-
VICE PROGRAM**

by N. H. McNally

Ontario Hosp. Services Commission

Published in HS-009 279; *Canada Safety Council. Proceedings of the 1st Conference, 1969, 8p*

Presented at First Conference of the Canada Safety Council, Ottawa, 5-7 May 1969.

The Ontario Ambulance Service Program is described. Plans and recommendations for personnel and personnel training as well as ambulance design and its standardization are discussed.

Search terms: Ontario; Ambulance personnel; Ambulance personnel training; Ambulance design; Standardization; Emergency medical services

HS-009 282 Fld. 1/1

**THE ROLE OF THE HOSPITAL
IN EMERGENCY TREATMENT**

Published in HS-009 279; *Canada Safety Council. Proceedings of the 1st Conference, 1969, 8p*

Presented at First Conference of the Canada Safety Council, Ottawa, 5-7 May 1969.

Ontario legislation for hospital managed emergency medical services and the implementation of that legislation is described.

Search terms: Ontario; Emergency medical services; Hospitals; Ambulance laws

HS-009 283 Fld. 1/1

EMERGENCY SERVICES

by Kenneth E. Wilson

Traffic Injury Res. Foundation of Canada

Published in HS-009 279; *Canada Safety Council. Proceedings of the 1st Conference, 1969, 3p*

Presented at First Conference of the Canada Safety Council, Ottawa, 5-7 May 1969.

The role of the physician in emergency services is discussed.

Search terms: Emergency medical services; Physicians

HS-009 284 Fld. 1/1

**AID TO THE INJURED: THE
SOUTH CAROLINA CONCEPT**

Anonymous

Published in *Journal of American Insurance* v46 n3 p1-8 (May-June 1970)

1/1 Emergency Services (Cont'd.)
HS-009 284 (Cont'd.)

South Carolina's emergency medical care system is described. The helicopter service doubles as traffic surveillance and ambulance.

Search terms: South Carolina; Emergency medical services; Helicopter ambulances

HS-009 285 Fld. 1/1

A CURRICULUM FOR TRAINING EMERGENCY MEDICAL TECHNICIANS

by J. D. Farrington; Oscar P. Hampton, Jr.

Published in *Bulletin of the American College of Surgeons* 4p (Oct 1969)

14 refs

Reprint.

Outlines a curriculum for ambulance personnel, and lists: references, printed material, audiovisual aids, and equipment for the course.

Search terms: Ambulance personnel training; Curricula; Instructional materials; Audiovisual aids

HS-009 286 Fld. 1/1

ESSENTIAL EQUIPMENT FOR AMBULANCES

by J. D. Farrington; Robert H. Brown; Francis J. Cox; Walter A. Hoyt, Jr.; William R. Ausland, Jr.; Charles S. Neer, 2nd; Watts R. Webb

Published in *Bulletin of the American College of Surgeons* p8-13 (Oct 1969)

Reprint

Equipment essential if ambulance attendants are to provide adequate care for the critically ill and injured at the

emergency scene and during transport to medical facilities is listed and illustrated. Extrication equipment necessary if no rescue vehicle accompanies the ambulance is listed.

Search terms: Ambulances; First aid equipment; Occupant rescue; Emergency equipment

1/3 Investigation

HS-009 287 Fld. 1/3; 1/4

MOTOR VEHICLE COLLISIONS IN ONTARIO

by J. R. Walshaw

Ontario Dept. of Transport

Published in HS-009 279; *Canada Safety Council, Proceedings of the 1st Conference*, 1969, 3p

Presented at First Conference of the Canada Safety Council, Ottawa, 5-7 May 1969.

The Ontario motor vehicle accident picture is presented in relation to who has the accidents and where they occur.

Search terms: Accident statistics; Ontario; Accident location

HS-009 288 Fld. 1/3

BASIC DATA REQUIRED FOR TRAFFIC ACCIDENT PREVENTION

by Bernard LaLande

Montreal Traf. Dept.

Published in HS-009 279; *Canada Safety Council, Proceedings of the 1st Conference*, 1969, 3p

Presented at First Conference of the Canada Safety Council, Ottawa, 5-7 May 1969.

Accident data and its use in accident prevention is outlined. Unexplained

differences in figures from similar cities points up the need to acquire statistics from the city to which the decisions will apply.

Search terms: Accident prevention; Accident data; Decision making

HS-009 289 Fld. 1/3; 3/5; 3/4

THE HUMAN ELEMENT IN HIGHWAY SAFETY

by J. Byron Nelson

Virginia Polytechnic Inst. and State Univ.

Published in HS-009 301; *Highway Safety Conference Proceedings*, Blacksburg, 1970, p43-9

The blame for accidents is usually placed on one of four basic groups: the victim, the item causing the injury, environmental factors, or "acts of God." The relationship between education and accident rates is discussed. A decision model of the accident process is included. There is a limit to the effectiveness of driver training, and it is difficult to prove a definite relationship between accident frequency and accident avoidance and driver training.

Search terms: Accident causes; Human factors; Accident factors; Driver education; Accident rates; Decision making; Driver behavior; Models; Accident avoidance

HS-009 290 Fld. 1/3

ACCIDENT RECORD SYSTEMS

by Ronald D. Lipps

Highway Users Federation for Safety and Mobility

Published in HS-009 301; *Highway Safety Conference Proceedings*, Blacksburg, 1970, p50-73

The uses to which accident data may be put are described. Types of accident reporting systems are discussed. Systems for processing accident records are classified into four categories: manual, punched card, basic computerized, and advanced computerized. The advantages and disadvantages of each category are discussed.

Search terms: Accident records; Accident reports; Automated accident records; Punched cards; Data processing

HS-009 291 Fld. 1/3; 1/4

TRAFFIC ACCIDENT RECORDS IN VIRGINIA

by W. B. Shelton

Virginia Dept. of Highways

Published in HS-009 301; *Highway Safety Conference Proceedings*, Blacksburg, 1970, p74-7

The Virginia Highway Department has used accident records extensively to detect accident locations and poorly engineered design features and to measure the effectiveness of improvements. A list of 20 uses for accident data is provided.

Search terms: Accident location; Roadside hazards; Accident records; Highway design; Highway improvements; Highway engineering

HS-009 292 Fld. 1/3

MOTOR CARRIER ACCIDENT INVESTIGATION. TRANS-AMERICAN VAN SERVICE, INC. ACCIDENT OF JUNE 16, 1969, GREELEY, COLO.

by Kenneth L. Pierson

Bureau of Motor Carrier Safety

9 Feb 1970 9p

A moving van transporting household goods collided head-on with an auto being towed, killing three occupants of the towed vehicle. The truck had swerved into the wrong side of a two-lane road in the path of opposing traffic. The truck driver was highly intoxicated and had a criminal record, but not a bad driving record. He had never had the physical examination required by motor carrier safety regulations. He had been on duty in excess of the allowable time under safety regulations. This accident illustrates both driver misconduct and lack of meaningful safety supervision by the motor carrier. The driver was sentenced to 5-10 years.

Search terms: Accident investigation; Truck drivers; Truck accidents; Head on collisions; Two lane roads; Driver intoxication; Motor carriers; Driver records; Driver criminal history; Fatalities; Wrong way driving; Accident case reports; Driver physical examinations; Regulations; Work time standards

HS-009 293 Fld. 1/3

HIGHWAY ACCIDENT REPORT. CHARTERED INTERSTATE BUS CRASH. INTERSTATE BUS 1-80S NEAR BEAVER FALLS, PENNSYLVANIA, DECEMBER 26, 1968

National Transportation Safety Board

23 Jan 1970 54p

A bus accident resulted in the death of three and injury severe enough for victim to be hospitalized to 14. Accident was attributed to: driver error; termination of guard rail; excessive slope of highway shoulder; slipperiness of shoulder. Deaths were attributed to: crushing between seat and collapsing roof support; partial ejection; repeated impacts to unusually heavy passenger. Deformation including sharp surfaces caused injuries.

Search terms: Bus accidents; Fatalities; Deformation; Driver error caused accidents; Highway design; Crushing; Injuries; Roof supports; Ejection

1/4 Locations

HS-009 294 Fld. 1/4; 2/9

ACCIDENT RISKS AND CAPACITY OF SINGLE-LEVEL INTERSECTIONS

by Valeri F. Babkov; E. M. Lobanov; B. M. Lebedev

Moscow Automobile and Road Construction Inst.

Published in HS-009 315; *International Study Week in Traffic and Safety Engineering* (10th), London, 1970

8p

A paper on Theme 2.

The accident rates for various kinds of intersections in the USSR are discussed. Study of some 1,500 at-grade intersections enabled the relative danger of different directions of traffic flow to be assessed, confirming that intersecting vehicle trajectories and the great difference between through and turning traffic speeds are the main contributory factors to accidents at intersections. Road design for safety at intersections is considered.

Search terms: Accident rates; Intersections; Accident location; Traffic flow; Vehicle trajectories; Speed differential; Highway design; USSR; Accident analysis

HS-009 295 Fld. 1/4; 2/9

ACCIDENT RISKS AND CAPACITY OF SINGLE-LEVEL INTERSECTIONS

by G. T. Bennett; F. C. Blackmore

1/4 Locations (Cont'd.)
HS-009 295 (Cont'd.)

Institution of Highway Engineers
(England); England Road Research Lab.

Published in HS-009 315; *International Study Week in Traffic and Safety Engineering* (10th), London, 1970.

14p 9 refs

A paper on Theme 2.

Results of studies of accidents and traffic flows at rural and urban intersections in the United Kingdom are discussed. Relationships between traffic flow and accidents and combinations of movements involved in accidents are described. Research carried out at the Road Research Laboratory is attempting to make better use of the limited area available at junctions to increase their capacity. Results achieved show that new design techniques can offer substantial improvements in capacity.

Search terms: Rural intersections; Urban intersections; Traffic capacity; Great Britain; Traffic flow; Accident rates; Accident location; Highway design; Accident statistics

HS-009 296 Fld. 1/4; 2/9

**PROBABILITY OF ACCIDENTS
AND ANALYSIS OF DELAYS AT
SOME TYPES OF SINGLE-LEVEL
INTERSECTION**

by B. Beukers; J. H. Jenezon

Netherlands Ministry of Transport

Published in HS-009 315; *International Study Week in Traffic and Safety Engineering* (10th), London, 1970

6p

A paper on Theme 2: Accident risks and capacity of single-level intersections.

For the purpose of arriving at more objective criteria on which to base the choice among three types of single-level intersection current in the Netherlands, an analysis of accidents was carried out, and the time lost through delays calculated. A Type A intersection is one where the main road does not divide and does not provide a left turn waiting lane; a Type B intersection is one where the main road divides into two; a Type C intersection has a divided main road and traffic lights. Types of accidents and traffic flow for each type are discussed.

Search terms: Netherlands; Intersections; Accident analysis; Time factors; Left turn lanes; Divided highways; Traffic signals; Accident types; Traffic flow; Accident risk forecasting

HS-009 297 Fld. 1/4; 2/9

**RISK OF ACCIDENTS AND
CAPACITY AT AT-GRADE ROAD
JUNCTIONS**

by Kh. Schaechterle; H. Kuzak; K. Pfundt; W. Mensebach

Published in HS-009 315; *International Study Week in Traffic and Safety Engineering* (10th), London, 1970

15p 37 refs

A paper on Theme 2: Accident risks and capacity of single-level intersections.

The distribution of accidents on rural roads is discussed, especially crossing and turning accidents at the various conflict points at crossroads and three-way junctions. The relation between the number of accidents and the total traffic volume at various types of crossroads and three-way junctions on urban roads is described. The relation between accident risk and capacity is developed.

Search terms: Traffic conflicts; Rural accidents; Intersections; Accident location; Traffic volume; Urban accidents; Traffic capacity; Accident risk fore-

casting; Statistical analysis; Turning; Rural intersections; Urban intersections

1/5 Statistical Data

HS-009 298 Fld. 1/5; 2/9

ONE-WAY STREETS AND PARKING

by Peter A. Mayer; Woodrow W. Rankin

Highway Users Federation for Safety and Mobility

1971 14p 20 refs

Ch. 10 of *Traffic Control and Roadway Elements - Their Relationship to Highway Safety. Revised*

The accident rates and traffic control problems of one way streets are described. Accident rates before and after streets were made one way are compared for a number of cities. Intersection and non-intersection accidents are also compared for one way streets and two way streets, as are day versus night accidents. One way streets generally are reported as reducing accidents, but this conclusion cannot be applied to all situations. The relationship between parking and accident rates is also examined. Eleven tables are included.

Search terms: Accident prevention; Accident rates; One way streets; Traffic control; Intersection collisions; Two way traffic; Day vs night accidents; Parking; Accident statistics

HS-009 299 Fld. 1/5; 5/4

**SOME COLLISION ASPECTS OF
BRITISH ROAD ACCIDENTS**

by G. M. MacKay

Published in *Automobile Engineer* v59 n13 p500-3 (Dec 1969)

based on accident studies of accidents. The relative frequency with which different areas of the car are struck is discussed, and the importance of impacts other than the direct frontal type is emphasized. Rollover accidents are discussed in relation to roof collapse and consequent injury. Various categories of objects struck are described; three-fourths are other vehicles, door opening during the collision phase is reviewed in terms of the mechanism whereby doors open and the rates with which they open, according to make of vehicle and the presence of longitudinal restraint designed into the latch mechanism. These results may help in establishing priorities for improved crash performance design of vehicles. Seven statistical tables are included for the accident types discussed.

Search terms: Accident statistics; Crashworthiness; Automobile design; Accident studies; Crash phase; Rollover accidents; Vehicle vehicle collisions; Accident types; Front end collisions; Roof caused injuries; Side impact collisions; Vehicle fixed object collisions; Door system failures; Door latch failures; Door latches; Automobile models; Door locks; Roof failures; Injury severity

2/0 HIGHWAY SAFETY

HS-009 300 Fld. 2/0

THE ROLE OF THE COUNCIL OF MINISTERS RESPONSIBLE FOR TRAFFIC SAFETY AND MOTOR VEHICLES ADMINISTRATION

by Darrel V. Heald

Saskatchewan Attorney General

Published in HS-009 279; *Canada Safety Council, Proceedings of the 1st Conference, 1969, 7p*

Presented at First Conference of the Canada Safety Council, Ottawa, 5-7 May 1969.

Search terms: Canada; Highway safety standards are discussed.

HS-009 301 Fld. 2/0

HIGHWAY SAFETY CONFERENCE, BLACKBURG, VIRGINIA, DEC. 15-17, 1969. PROCEEDINGS

by Jason C. Yu, Ed.

Virginia Polytechnic Inst. and State Univ.

Dec 1970 126p

Sponsored by Virginia Polytechnic Inst. and State Univ. and U. S. Dept. of Housing and Urban Development. Includes HS-009 289 - HS-009 291; HS-009 302 - HS-009 303; HS-009 306; HS-009 320; HS-009 330

Twelve papers on highway safety are presented. Aspects included are highway design, accident records, pedestrian safety, roadway lighting and delineation, traffic control devices, and the human element in highway safety.

Search terms: Conferences; Highway safety; Highway design; Accident records; Pedestrian safety; Highway lighting; Delineators (traffic); Traffic control devices; Human factors

HS-009 302 Fld. 2/0

HIGHWAY SAFETY PROGRAMS

by James D. Foley

Federal Highway Administration

Published in HS-009 301; *Highway Safety Conference Proceedings, Blacksburg, 1970, p1-10*

The organization and functions of the National Highway Safety Bureau are

programs briefly discussed.

Search terms: National Highway Safety Bureau; Highway safety standards; State planning; Highway safety programs

HS-009 303 Fld. 2/0; 4/1

VIRGINIA HIGHWAY SAFETY PROGRAM AND ENFORCEMENT

by John T. Hanna

Virginia Highway Safety Div.

Published in HS-009 301; *Highway Safety Conference Proceedings, Blacksburg, 1970, p28-42*

The enforcement of Virginia's highway safety program includes establishment of committees which are responsible for various program aspects; public information programs; improvement in procedures for issuing traffic summonses; the use of the Habitual Offenders Act to remove drivers with bad records from the road; improvement in traffic records and traffic courts.

Search terms: Highway safety programs; Virginia; Safety propaganda; Public relations; Habitual Offender Act of 1968 (Virginia); Driver records; Traffic courts; Traffic records; Traffic law violations

HS-009 304 Fld. 2/0

71 YEARS OF HIGHWAY DEATHS IS ENOUGH

by John A. Volpe

Department of Transportation

Published in *Analogy* n9 p4-9 (1970)

The first traffic fatality in the United States is described. The highway toll is

2/0 Highway Safety (Cont'd.)

HS-009 304 (Cont'd.)

discussed including a projected figure per present trends. The National Highway Safety Bureau's programs and standards are offered as a hope for reducing deaths and injuries.

Search terms: National Highway Safety Bureau; Highway safety; Safety standards; Federal state relationships; Accident prevention; Accident case reports; History; Accident risk forecasting

2/4 Design and Construction

HS-009 305 Fld. 2/4

GEOMETRIC DESIGN RELATED TO TRAFFIC SAFETY

by Richard D. Walker

Virginia Polytechnic Inst. and State Univ.

Published in HS-009 301; *Highway Safety Conference Proceedings*, Blacksburg, 1970, p11-6

Highway designers should keep the driver in mind and avoid design features which will take drivers by surprise. Design aspects discussed include: providing for vehicle failures; sight distance; slippery pavements; ramps; deceleration lanes; curves; acceleration lanes; channelization of intersections.

Search terms: Highway design; Failures; Sight distances; Ramps; Deceleration lanes; Acceleration lanes; Road curves; Channelized intersections; Pavement skidding characteristics; Human factors

HS-009 306 Fld. 2/4

HIGHWAY DESIGN FOR SAFETY IN VIRGINIA

by Frank E. Tracy

Virginia Dept. of Highways

Published in HS-009 301; *Highway Safety Conference Proceedings*, Blacksburg, 1970, p17-27

Design aspects discussed are: road shoulders; medians; guardrails; impact attenuators.

Search terms: Highway design; Highway safety; Road shoulders; Median barrier design; Medians; Guardrail design; Impact attenuators; Roadside hazards; Virginia

2/5 Lighting

HS-009 307 Fld. 2/5

TRENDS IN LIGHTING MOTORWAYS AND THEIR INTERCHANGES

by Matthew C. Sielski

Chicago Motor Club

Published in HS-009 315; *International Study Week in Traffic and Safety Engineering* (10th), London, 1970

2p 9 refs

A paper on Theme 3: Recent developments in methods of improving night visibility.

The Highway Research Board is encouraging studies in proper street lighting design. For too many years highway officials have relied upon manufacturers of equipment to develop proper design. No new innovations have been tried for the past 30 years. Recent American and European developments and experiments indicate that there is room for additional progress. The U.S. road lighting standard, optimum spacing, high mounted lighting, and safety criteria for lighting installations are briefly discussed.

Search terms: Street lighting; Lighting design; Lighting standards; Highway lighting; High level lighting; Safety design; Roadside hazards; Interchanges

HS-009 308 Fld. 2/5

A FUNCTIONAL APPROACH TO LIGHTING RESEARCH

by D. A. Schreuder

Stichting Wetenschappelijk Onderzoek Verkeersveiligheid (Netherlands)

Published in HS-009 315; *International Study Week in Traffic and Safety Engineering* (10th), London, 1970

5p 7 refs

A paper on Theme 3: Recent developments in methods of improving night visibility.

Cases where a traditional approach does not offer a satisfactory solution are described and a functional approach is recommended. These cases are: motorways between intersections; pedestrian crossings; motor car lighting; and tunnel entrance lighting. Lack of progress in improving night visibility in regard to these areas is due to lack of basic understanding rather than lack of technical knowledge.

Search terms: Highway lighting; Vehicle lighting; Intersections; Pedestrian crossings; Tunnel lighting; Night visibility; Street lighting

HS-009 309 Fld. 2/5; 5/10

RECENT DEVELOPMENTS IN METHODS OF IMPROVING NIGHT VISIBILITY

by Edwin Hartmann; Rudiger Linde

Allgemeiner Deutscher-Automobil Club

Published in HS-009 315; *International Study Week in Traffic and Safety Engineering* (10th), London, 1970

10p 8 refs

A paper on Theme 3.

The influence of road lighting on the traffic and accident pattern on motor-

the lighting of junctions, recommendations for international standardization of road lighting and the limitation of dazzle risks, vehicle lighting progress, the use of reflective materials on vehicles are also discussed.

Search terms: Highway lighting; West Germany; Highway lighting standards; Vehicle lighting; Reflective materials; Vehicle visibility; Accident factors; Night; Traffic flow; Interchanges; International factors; Glare reduction; Night visibility

HS-009 310 Fld. 2/5

FACTORS IN HIGHWAY LIGHTING

by Dan M. Finch

California Univ., Berkeley

Published in HS-009 331; *Visual Factors in Transportation Systems*, 1969 p52-5

Presented at Spring Meeting of NAS-NRC Committee on Vision, Washington, D. C., 1969.

Low mounted luminaires are emphasized in this discussion of highway lighting.

Search terms: Highway lighting mounting height; Highway lighting

2/8 Police Traffic Services

HS-009 311 Fld. 2/8

POLICE OFFICERS WITHOUT POWERS OF ARREST

by John Murray

Metropolitan Toronto Police Force

Published in HS-009 279; *Canada Safety Council. Proceedings of the 1st Conference*, 1969, 2p

Presented at First Conference of the Canada Safety Council, Ottawa, 5-7 May 1969.

Ontario has no legal means of compelling

the advisability of police power to arrest is discussed.

Search terms: Police traffic services; Police law enforcement responsibilities; Police power; Out of state drivers

HS-009 312 Fld. 2/8

POLICE OFFICERS WITH POWERS OF ARREST

by Robert Kinzel

Saskatoon Police Dept.

Published in HS-009 279; *Canada Safety Council Proceedings of the 1st Conference*, 1969, 2p

Presented at First Conference of the Canada Safety Council, Ottawa, 5-7 May 1969.

Problems relating to use of police power are discussed in relation to pedestrian violations and the authority to seize a vehicle of any person committing an offense.

Search terms: Police law enforcement responsibilities; Police power; Pedestrian arrests

HS-009 313 Fld. 2/8

JUDICIAL VIEWPOINT

by Rene Marin

Ontario Provincial Court

Published in HS-009 279; *Canada Safety Council Proceedings of the 1st Conference*, 1969, 2p

Presented at First Conference of the Canada Safety Council, Ottawa, 5-7 May 1969.

Giving the police the power to bring the accused before a Justice of the Peace and make him pay a guarantee he will make a court appearance is recommended.

Search terms: Police law enforcement

HS-009 314 Fld. 2/8; 2/9

A STUDY OF THE IMMEDIATE EFFECTS OF ENFORCEMENT ON VEHICULAR SPEEDS

by Forrest M. Council

North Carolina Univ.

Mar 1970 50p 15 refs

This study examined the effects on vehicular speeds of two types of enforcement symbols in or adjacent to the traffic stream on rural roadways. The enforcement units of the North Carolina Highway Patrol were: a single stationary patrol vehicle parked adjacent to the roadway in a position visible to oncoming traffic; and, a single patrol vehicle moving in the stream of traffic. Data were collected approximately 1¼ miles upstream from the patrol unit and 1¼ miles downstream from the unit. Changes in speed resulted in the final conclusions: analysis indicated reduction in mean speed, variance and in the percentage of vehicles traveling above the posted speed limit and the speed limit plus tolerance when the stationary unit was employed on all test tracks under all test conditions; analysis showed no significant change or a significant increase in the corresponding measurements between the upstream and downstream points when the moving patrol unit was introduced into the traffic stream.

Search terms: Police traffic services; Patrolling; Speed reduction; Speed patterns; Speed limits; Traffic law enforcement

2/9 Traffic Control

HS-009 315 Fld. 2/9

INTERNATIONAL STUDY WEEK IN TRAFFIC AND SAFETY ENGINEERING (10th), ROTTERDAM, 7-11 SEPTEMBER 1970

HIGHWAY SAFETY

2/9 Traffic Control (Cont'd.) HS-009 315 (Cont'd.)

Published by World Touring and Automobile Organisation, London

1970

Published as a folder containing six themes, each bound separately and consisting of separately paged papers on that theme. The following themes have been analyzed: Nos. 2, 3, and 7. Themes 4, 5, and 9 are omitted from the folder and will be published later. Includes

HS-009 294 - HS-009 297;
HS-009 307 - HS-009 309;
HS-009 316 - HS-009 319;
HS-009 363 - HS-009 364.

The themes discussed are as follows: 1. Factors affecting the number of trips by private and public transport. 2. Accident risks and capacity of single-level intersections. 3. Recent developments in methods of improving night visibility. 4. A logical framework for categorizing highway safety phenomena and activity. 5. Methods of reducing amenity losses caused by traffic: (a) vehicles; (b) roads. 6. Effect of parking policies on traffic volumes. 7. Effectiveness of speed limits on rural roads and motorways. 8. Principles which should govern the location and priorities of the roads in motorway networks. 9. Influence of type of road network on the distribution of traffic in towns.

Search terms: Public transportation usage; Automobile usage; Trip geography; Traffic generation; Accident risks; Traffic capacity; Intersections; Night visibility; Highway lighting; Vehicle lighting; Parking; Traffic volume; Speed limits; Rural roads; Rural highways; Highway location; Traffic engineering; Safety engineering; Conferences

HS-009 316 Fld. 2/9; 4/1

SPEED LIMITS ON ROADS

by Mariano Gullon Low; Roberto de la Torre Sanchez

Published in HS-009 315; *International Study Week in Traffic and Safety Engineering* (10th), London, 1970

6p 10 refs

A paper on Theme 7: Effectiveness of speed limits on rural roads and motorways.

This paper deals with general speed limits in Europe as applied in built-up areas and on the open road. Arguments both for and against the different possible types of limit are given. Eight recommendations for applying speed limits are included.

Search terms: Europe; Speed limits; Rural areas; Urban areas

HS-009 317 Fld. 2/9

EFFECTIVENESS OF SPEED LIMITS ON RURAL ROADS AND MOTORWAYS

by Edward A. Mueller

Highway Research Board

Published in HS-009 315; *International Study Week in Traffic and Safety Engineering* (10th), London, 1970

11p 15 refs

A paper on Theme 7.

Speed limits and speed patterns in the United States are discussed. Use of higher speeds makes greater mobility possible, since it is time that is significant rather than distance. Aspects described include speed versus safety; high speed versus accident severity; decreasing of high speeds; increasing of low speeds; night speed limits; minimum limits; truck speeds; speed limit practices in states, including speed zoning; recent studies on speed limits. A table of rural speed limits for all states is given.

Search terms: Speed limits; Speed zoning; Speed limit effectiveness; Speed patterns; United States; High speed; Accident severity; Minimum speed limits; Night speed limits; Trucks; Speed studies; Time factors; Low speed

HSL No. 71-20

drivers; Speed differential; Rural highways; Rural roads

HS-009 318 Fld. 2/9

THE EFFECTIVENESS OF SPEED LIMITS ON RURAL ROADS IN THE GERMAN FEDERAL REPUBLIC

by K. Krell

Bundesanstalt fur Strassenwesen, Cologne

Published in HS-009 315; *International Study Week in Traffic and Safety Engineering* (10th), London, 1970

9p 10 refs

A paper on Theme 7: Effectiveness of speed limits on rural roads and motorways.

Traffic flow on rural roads is discussed. It is probable that increasing traffic will reduce the speeds on rural roads. Several studies are described which indicate that, in the absence of a speed limit, drivers do not limit their speeds responsibly but engage in excessive lane changing and risk taking. Driver acceptance of speed limits is discussed; many drivers do not consider them as absolute prohibitions and oppose stricter enforcement. A procedure for fixing speed limits empirically is briefly described.

Search terms: Rural traffic flow; Speed patterns; Rural roads; Speed limits; Lane changing; Risk taking; West Germany; Speed limit effectiveness; Rural highways; Driver attitudes

HS-009 319 Fld. 2/9; 4/1

THE APPLICATION OF SPEED REGULATIONS IN DENMARK

by Niels O. Jorgensen

Danish Council of Road Safety Research

Published in HS-009 315; *International Study Week in Traffic and Safety Engineering* (10th), London, 1970

A paper on Theme 7: Effectiveness of speed limits on rural roads and motorways.

The elimination of general speed limits in Denmark in 1953 led to an increase in personal injury accidents and fatalities. Since 1953 the creation of speed zones with posted speed limits has been the main action taken in regard to speed regulation. No comprehensive study in Denmark has been made to prove their efficiency. Temporary speed limits were introduced for holidays and summer weekends from 1961-64. It was impossible to show that these limits had any effect on accident rates in Denmark. A similar experiment in Sweden permits the interpretation that propaganda and police enforcement may be more important than the speed limits as such. A small number of experiments with advisory speed signs on sharp road curves indicates the value of this safety measure.

Search terms: Speed limits; Accident rates; Injury rates; Fatality rates; Denmark; Sweden; Speed limit effectiveness; Speed signs; Road curve signs; Traffic law enforcement; Police traffic services; Safety propaganda; Accident statistics; Speed zones

HS-009 320 /Fld. 2/9

TRAFFIC CONTROL DEVICES — CURRENT STANDARDS AND NEW TECHNIQUES

by Vincent Ciletti

Federal Highway Administration

Published in HS-009 301; *Highway Safety Conference Proceedings*, Blacksburg, 1970, p100-13

The value of uniformity in traffic control devices is discussed. The highway safety standard on traffic control devices, the Manual on Uniform Traffic Control Devices for Streets and Highways, the computer control of traffic signals, passing aid systems, the electronic route guidance system, and developments in

signs are discussed.

Search terms: Manual on Uniform Traffic Control Devices for Streets and Highways; Traffic control devices; Traffic control device uniformity; Highway safety standards; Computer controlled signals; Passing aid systems; Electronic Route Guidance System; Traffic signs; Highway signs

HS-009 321 Fld. 2/9

AN INTERVEHICULAR SPACING DISPLAY FOR IMPROVED CAR-FOLLOWING PERFORMANCE

by Robert E. Penton; William B. Montano

Published in *IEEE Transactions on Man-Machine Systems* vMMS-9 n2 p29-35 (Jun 1968)

10 refs

Driver inability to detect small headway changes and small relative velocities is a primary reason for poor car-following performance, which can be greatly improved by supplying information concerning the state of a lead car. A control stick with built-in kinesthetic-tactile display was tested and performance compared to those when no aid was used. Sizable reductions in velocity variance and headway variance were obtained for the aided drivers.

Search terms: Vehicle spacing display devices; Car following; Headways; Instrumented vehicles; Driver performance; Speed patterns; Mathematical models; Kinesthetic perception

HS-009 322 Fld. 2/9

NO-PASSING ZONES: CRITERIA, LEGISLATION AND LOCATION. FINAL REPORT

by Gerald W. VanValkenburg

Purdue Univ.

17 Jun 1969 132p 18 refs
Report no. JHRP-19

Master's thesis.

The purpose of this study was to determine which no-passing zone concept should be adopted to assure maximum safety and comfort for the motoring public; to determine appropriate criteria and legislation to implement the recommended concept; and to determine an economical, efficient method to establish the limits of no-passing zones in the field. The results of this research indicate that the long zone concept, which legally allows the completion of a passing maneuver within a no-passing zone, should be adopted. Criteria and a model law required to implement the concept and a suggested method for measuring sight distance and locating the limits of no-passing zones in the field were developed.

Search terms: No passing zones; Sight distances; Passing; State laws; Uniform vehicle code; Speed studies; Passing zone markings; Indiana; Sign location; Mathematical analysis; Research methods; Overtaking; Eye location

3/0 HUMAN FACTORS

3/1 Alcohol

HS-009 323 Fld. 3/1

ALCOHOL-TRAFFIC LEGISLATION. A REPORT OF PROGRESS

by Charles E. Ebeling

Published in *Analogy* n8 p25-7 (1970)

There still are 27 states without 0.10 percent chemical test for alcohol laws, and five states without implied consent. Nine states presently have 0.15 percent chemical test laws to be reformed down to the 0.10 percent maximum of the national standards. One state is without any chemical test law.

HUMAN FACTORS

HSL No. 71-20

3/1 Alcohol (Cont'd.) HS-009 323 (Cont'd.)

Search terms: State laws; Alcohol laws; Blood alcohol levels; Implied consent laws; Alcohol blood tests

3/4 Driver Behavior

HS-009 324 Fld. 3/4

EVALUATION OF DRIVING PERFORMANCE CRITERIA. FINAL REPORT

by Slade Hulburt; Jinx Beers

California Univ. ITTE

Jan 1969 41p 10 refs
Report no. 69-4

The primary purpose of this study was to develop techniques of scoring and data handling. Several possible driving behavior patterns or trends were indicated from performance in the Driving Simulation Laboratory and showed some signs of being related to past history of accidents and traffic violations and also to the Case-Stewart driving questionnaire.

Search terms: Driver performance; Data processing; Data analysis; Driver behavior research; Driving simulation research; Accident records; Driver records; Traffic law violations; Questionnaire; Psychological tests; Evaluation; Driver characteristics

HS-009 325 Fld. 3/4; 4/7; 1/3; 1/5

DRIVER BEHAVIOR AND ACCI- DENT INVOLVEMENT: IM- PLICATIONS FOR TORT LIABILITY.

by Joseph Ferreira, Jr.

Department of Transp.

Oct 1970 217p 21 refs

Department of Transportation Auto-
mobile Insurance and Compensation
Study.

Statistics developed from driver accidents data are often used to support the argument that a small proportion of drivers accounts for a larger proportion of the accidents, and that removing this small proportion of drivers from the road would substantially reduce the total number of accidents. This paper investigates the accuracy of such inferences using, as a primary data source, six year accident records of 7,842 California drivers. Examination of the results suggests that, even though substantial differences in accident likelihood do exist among drivers, it is not feasible to reduce drastically the total number of traffic accidents simply by dealing with only a small fraction of drivers.

Search terms: Accident risk forecasting; Accident prevention; Accident proneness; California; High risk drivers; Driver records; Probability theory; Accident statistics; Accident rates; Mathematical models; Negligence; Accident repeater drivers; Fault; Driver behavior; Accident causes; Torts; Epidemiology; Perception; Car following; Passing; Ramps

AVAILABILITY: GPO \$1.00

3/5 Driver Education

HS-009 326 Fld. 3/5

A WOMAN'S SUCCESS STORY

by Gladys Beattie

New Brunswick Safety Council, Inc.
(Canada)

Published in HS-009 279; *Canada Safety Council. Proceedings of the 1st Conference*, 1969, 9p

Presented at First Conference of the
Canada Safety Council, Ottawa, 5-7
May 1969.

The defensive driver course is described

from the organizational and management
point of view.

Search terms: Defensive driving;
Driver education; Instructors

HS-009 327 Fld. 3/5

ACCIDENT PREVENTION AND SURVIVAL: KINDERGARTEN THROUGH HIGH SCHOOL

by Robert H. Kirk

Published in *Analogy* n8 p28-31 (1970)

Recommendations for safety education, based on the principle that personal behavior is a concrete whole, include objectives for safety experiences from kindergarten through senior high school. Driver and traffic safety education is only one of the many essential areas in accident prevention and survival.

Search terms: Curricula; Safety education; Children; Behavior

HS-009 328 Fld. 3/5

ANOTHER VIEW OF THE GAP IN DRIVER EDUCATION COM- MUNICATION

by Richard Tosell

Published in *Traffic Safety* v70 n5
p12-4, 35-6 (May 1970)

Relationship between secondary school driver educators and commercial driving schools regarding standards, objectives, and philosophy is discussed.

Search terms: High school driving courses; Commercial driving schools; Driver education standards

3/7 Drugs Other Than Alcohol

HS-009 329 Fld. 3/7; 3/1

DRUGS AND DRIVING

by A. C. Hardman

Canada Dept. of National Health and Welfare

Published in HS-009 279; *Canada Safety Council. Proceedings of the 1st Conference, 1969, 7p*

Presented at First Conference of the Canada Safety Council, Ottawa, 5-7 May 1969.

The analysis of tissue for presence of drugs in persons involved in accidents is deemed difficult, expensive, slow, and frustrating. A public health method of studying the problem — agent, host environment — is suggested. Guidelines for physicians, pharmacists, motorists, and agencies are set forth.

Search terms: Drug caused accidents; Drug effects; Synergism; Physicians; Pharmacology; Driver intoxication

3/11 Pedestrians

HS-009 330 Fld. 3/11

PEDESTRIAN SAFETY

by Jason C. Yu

Virginia Polytechnic Inst. and State Univ.

Published in HS-009 301; *Highway Safety Conference Proceedings*, Blacksburg, 1970, p78-86

A sound pedestrian safety program requires good traffic engineering, pedestrian education, and law enforcement. Pedestrian accident statistics indicate the factors involved in this type of accident, such as alcohol, darkness, rural versus urban locations. The legal basis for pedestrian control is discussed. School crossing protection is also discussed.

Search terms: Pedestrian control; Pedestrian accidents; Pedestrian intoxication; Pedestrian visibility; Pedestrian

safety; Rural accidents; Urban accidents; School crossing protection; Pedestrian education; Accident statistics; Law enforcement; Traffic engineering

3/12 Vision

HS-009 331 Fld. 3/12; 2/9; 5/10; 2/5

VISUAL FACTORS IN TRANSPORTATION SYSTEMS. PROCEEDINGS OF SPRING MEETING, 1969

National Acad. of Sciences — National Res. Council

1969 135p 100 refs

Presented at Spring Meeting of NAS-NRC Committee on Vision, Washington, D. C., 1969. Includes HS-009 310; HS-009 332 — HS-009 334; HS-009 365.

Papers were presented on the following subjects: visual problems of truck, bus, and automobile drivers; visibility and legibility of highway signs and markings; vehicle exterior lighting; highway lighting; and visual problems in air transportation including the helicopter.

Search terms: Driver vision standards; Highway signs; Visibility; Legibility; Vehicle lighting; Highway lighting; Vision; Helicopters; Pilots; Truck drivers; Bus drivers; Automobile drivers; Aircraft accidents; Air transportation; Sign legibility; Sign visibility

AVAILABILITY: NTIS

HS-009 332 Fld. 3/12; 5/2; 5/20

VISUAL PROBLEMS OF TRUCK AND BUS DRIVERS

by William C. Neidig

Eastern Conference of Teamsters

Published in HS-009 331; *Visual Factors in Transportation Systems*, 1969, p1-3

Presented at Spring Meeting of NAS-NRC Committee on Vision, Washington, D. C., 1969.

Safe truck driving calls for good visual acuity and good depth perception. Peripheral vision is reduced as speed of vehicle is increased. Night driving practices are reviewed. The vehicle blind spot can be eliminated with a convex mirror. That vision standards be established by the trucking industry is recommended.

Search terms: Driver vision standards; Visual acuity; Peripheral vision; Depth perception; Speed; Blind spots; Convex mirrors; Truck drivers; Night driving; Bus drivers

AVAILABILITY: NTIS

HS-009 333 Fld. 3/12

VISUAL PROBLEMS IN AUTOMOBILE DRIVING

by Warren M. Heath

California Dept. of Hwy. Patrol

Published in HS-009 331; *Visual Factors in Transportation Systems*, 1969, p4-11

Presented at Spring Meeting of NAS-NRC Committee on Vision, Washington, D. C., 1969.

Visibility in relation to automobile design is discussed.

Search terms: Visibility; Windshield design; Body design; Eye location; Vehicle lighting; Research methods

AVAILABILITY: NTIS

OTHER SAFETY-RELATED AREAS

HS-009 334 Fld. 3/12; 2/9; 4/7

FACTORS IN VISIBILITY AND LEGIBILITY OF HIGHWAY SIGNS AND MARKINGS

by T. W. Forbes

Michigan State Univ.

Published in HS-009 331; *Visual Factors in Transportation Systems*, 1969, p12-29

26 refs

Presented at **Spring Meeting** of NAS-NRC Committee on Vision, Washington, D. C., 1969.

Studies of sign legibility factors have indicated greater legibility for wide letters, stroke-width from 14 to 25% of letter height, wider letter spacing and brightness contrast in the range of 50% or better. Legibility distances for block letter signs under daylight conditions may be taken to be about 50ft/in of letter height. Attention-gaining visibility characteristics of highway signs at suprathreshold levels are important when highway signs compete with other signs and visual stimuli.

Search terms: Highway signs; Visibility; Legibility; Mathematical models; Sign legibility; Sign visibility

AVAILABILITY: NTIS

4/0 OTHER SAFETY RELATED AREAS

4/1 Codes and Laws

HS-009 335 Fld. 4/1

TRAFFIC SAFETY LEGISLATION - EAST AND WEST

by H. H. D. Cochrane

New Brunswick Dept. of the Provincial Secretary

Published in HS-009 279; *Canada Safety Council. Proceedings of the 1st Conference*, 1969, 3p

Presented at First Conference of the Canada Safety Council, Ottawa, 5-7 May 1969.

Need for safety legislation in Canada is discussed.

Search terms: Canada; Safety laws; Traffic laws

HS-009 336 Fld. 4/1

MOTOR VEHICLE LEGISLATION AFFECTING SAFETY

Anonymous

Published in HS-009 279; *Canada Safety Council. Proceedings of the 1st Conference*, 1969, 7p

Presented at First Conference of the Canada Safety Council, Ottawa, 5-7 May 1969.

Traffic and vehicle laws are listed chronologically for each province in Canada.

Search terms: Canada; Safety laws; Traffic laws; Vehicle laws

HS-009 337 Fld. 4/1

WE AND OUR LAWS

by Marcel Baril

Quebec Province Ministry of Transport and Commun.

Published in HS-009 279; *Canada Safety Council. Proceedings of the 1st Conference*, 1969, 5p

Presented at First Conference Safety Council, Ottawa, 5-7 May 1969.

The role of laws in highway safety is discussed.

Search terms: Canada; Safety laws; Traffic laws

HSL No. 71-20

HS-009 338 Fld. 4/1

SPEED LIMITS SHOULD BE ENFORCED

by Robert McKie

Ontario Provincial Police

Published in HS-009 279; *Canada Safety Council. Proceedings of the 1st Conference*, 1969, 3p

Presented at First Conference of the Canada Safety Council, Ottawa, 5-7 May 1969.

The relationship of speed and accidents is discussed. Recommendations for enforcement legislation regarding speed are offered.

Search terms: Low speed caused accidents; High speed caused accidents; Speed limits; Traffic law enforcement

HS-009 339 Fld. 4/1

JUDICIAL COMMENTARY

by Rene Marin

Ontario Provincial Court

Published in HS-009 279; *Canada Safety Council. Proceedings of the 1st Conference*, 1969, 6p

Presented at First Conference of the Canada Safety Council, Ottawa, 5-7 May 1969.

Speed law enforcement is discussed from the viewpoint of the court.

Search terms: Traffic law enforcement; Speed limits; Courts

HS-009 340 Fld. 4/1; 1/3

HIT AND RUN - PLACING THE DRIVER BEHIND THE WHEEL. PT. 2

refs

Statutory requirements that drivers involved in accidents stop, remain at the scene, give certain required information and render assistance are intended for the protection and benefit of the entire motoring public. Encouraging compliance with such statutes requires effective prosecution of violators. Consequently, the frequent absence of eyewitnesses in hit-and-run cases, makes circumstantial evidence from the road, the vehicles and persons involved extremely important. Facts such as damage to the defendant's vehicle or matching paint or parts found at the scene can establish conclusively the identity of the hit-and-run vehicle. In identifying the *driver*, proof of ownership is a very significant factor, but in the majority of states proof of ownership, without more, is not sufficient to sustain a conviction. Circumstantial evidence will sustain a conviction where it excludes every *reasonable* hypothesis of innocence; that is, where it is of such probative force as to enable the jury to say that the defendant is guilty beyond a reasonable doubt.

Search terms: Hit and run accidents; Evidence; Convictions; Driver identification in accidents; Court decisions; State laws; Automobile ownership

4/5 Information Technology

HS-009 341 Fld. 4/5; 5/17

ANALOG SEVERITY INDEX
COMPUTER INSTRUMENTATION REPORT

by D. T. Sierns; R. B. Ballmer

General Motors Proving Ground

17 Mar 1970 26p
Report no. PG-28512

severity index computer are presented.

Search terms: Damage severity index
Analog computers; Manuals; Instru-
mentation; Parts catalogs; Severity in-
dexes

4/6 Insurance

HS-009 342 Fld. 4/6; 1/3; 3/5;
1/5

QUANTITATIVE MODELS FOR AUTOMOBILE ACCIDENTS AND INSURANCE

by Joseph Ferreira, Jr

Department of Transp.; Massachusetts
Inst. of Tech.

Sep 1970 197p 66 refs

Department of Transportation Automobile Insurance and Compensation Study.

This report concerns the involvement of motorists in accidents and the resulting interaction among motorists, federal and state governments, and insurance companies. Particular attention is given to the development of quantitative models that may be used in comparing alternative government actions in regulating motorists. The effects on previously licensed drivers of several possible licensing programs are studied in detail. Central to the analysis of these programs is the choice of a model for the involvement of drivers in accidents. The compound Poisson model of Greenwood and Woods is used for this purpose and results in a negative binomial form for the distribution of accidents. The accuracy of the model is tested using six-year accident data for 7842 California drivers. The long time-period of the data enables several tests to be made that have not previously been reported in automobile accident work. The results indicate that the model is sufficiently accurate for the purpose of predicting

will be involved. As an illustration of the value of quantitative methods in examining automobile accident and insurance problems, a model of remedial licensing programs is developed and used to compare several, specific alternatives. A novel Bayesian interpretation of the compound Poisson model is used in order to estimate cumulative effects of various driver training programs over several years. The analysis provides estimates of the effects of such programs in terms of savings in accidents, administrative cost, inconvenience to drivers, and the extent to which hazardous drivers are singled out by the programs.

Search terms: Driver records; Accident records; Driver license laws; State laws; Federal control; Accident studies; California; Insurance industry; Mathematical models; Accident risks; forecasting; Driver education evaluation; Driver licensing; Bayes theorem; Regression analysis; Poisson density functions; Accident prevention; Costs; Accident repeater drivers; Driver improvement schools

AVAILABILITY: GPO \$1.00

5/0 VEHICLE SAFETY

5/1 Brake Systems

HS-009 343 Fld. 5/1

BRAKES

by F. R. B. King

Published in *Automobile Engineer* v60
n6 p231-4 (8 May 1970)

Many anti-locking systems are under development, but few have been installed in production cars. There are still few examples of cars with disc brakes at the rear. Developments in brake systems are outlined in regard to American, British, and European cars.

Search terms: Brakes; Brake systems; Antilocking devices; Disc brakes; Brit-

5/1 Brake Systems (Cont'd.)

HS-009 343 (c)

ish vehicles; European vehicles; Brake design

HS-009 344 Flid. 5/1

BENDIX-WESTINGHOUSE DEVELOPING ANTI-SKID SYSTEM

by Jack Lyndall

Published in *Fleet Owner* v65 n5 p81-4 (May 1970)

A new nonskid braking system is now in advanced prototype stage. The system is called "adaptive" because it automatically adapts to variations in surface conditions, static or dynamic wheel loads, brake efficiency, and condition of tires. It prevents wheel lock under any braking conditions. Tests already have been run for road surface conditions. Further tests are planned.

Search terms: Brake systems; Antilocking devices; Antiskid devices; Vehicle road interface; Static loads; Dynamic loads; Road tests; Tire characteristics; Brake performance; Coefficient of friction

5/2 Buses, School Buses, and Multipurpose Passenger Vehicles

HS-009 345 Flid. 5/2; 3/10

PROBLEMS WITH STUDENTS

by Murray McAlpine

Skinner School Bus Line Ltd. (Canada)

Published in HS-009 279; *Canada Safety Council. Proceedings of the 1st Conference, 1969, 3p*

Presented at First Conference of the Canada Safety Council, Ottawa, 5-7 May 1969.

Handling of discipline on school buses by the bus driver and the cooperation he receives from the school administrator and the local police department are discussed.

Search terms: School bus passengers; School bus drivers; School bus safety; Police

HS-009 346 Flid. 5/2; 3/10

SCHOOL BUS PATROLS

by J. Fraser Reavell

Ontario Dept. of Transport

Published in HS-009 279; *Canada Safety Council. Proceedings of the 1st Conference, 1969, 4p*

Presented at First Conference of the Canada Safety Council, Ottawa, 5-7 May 1969.

Describes how assistance in the form of school bus safety patrols is provided for the school bus driver. Members of this patrol receive special training in handling routine checks on passengers and equipment and in handling emergencies.

Search terms: School bus passengers; School bus drivers; School bus safety; School safety patrols

HS-009 347 Flid. 5/2

SELECTING THE CHASSIS AND COMPONENTS FOR SCHOOL BUS APPLICATION

by Andrew Nosotti

Chrysler Canada Ltd.

Published in HS-009 279; *Canada Safety Council. Proceedings of the 1st Conference, 1969, 10p*

Presented at First Conference of the Canada Safety Council, Ottawa, 5-7 May 1969.

Considerations for selection of school buses are presented. Specifications for load estimates, electrical components, horsepower, engine, and drivetrain are listed.

Search terms: School buses; Specifications

HS-009 348 Flid. 5/2

HOW SAFE ARE SCHOOL BUSES TODAY?

by Barry McMaster

Canadian Bluebird Coach Ltd.

Published in HS-009 279; *Canada Safety Council. Proceedings of the 1st Conference, 1969, 3p*

Presented at First Conference of the Canada Safety Council, Ottawa, 5-7 May 1969.

History of school bus manufacture is presented briefly. Accident tests on school buses are described. Safety features available for school buses are listed.

Search terms: School bus safety

HS-009 349 Flid. 5/2

MINIMUM STANDARDS FOR SCHOOL BUSES IN CANADA

by Clarence J. Kenway

Alberta Hwy. Traf. Board

Published in HS-009 279; *Canada Safety Council Proceedings of the 1st Conference, 1969, 7p*

Presented at First Conference of the Canada Safety Council, Ottawa, 5-7 May 1969.

Minimum standards and uniform practices that ought to be adopted throughout Canada are discussed.

HS-009 350 Fld. 5/2**SCHOOL BUSES — SAFE FOR CHILDREN?**

by Hugh Young

Ontario Dept. of Transport

Published in HS-009 279; *Canada Safety Council, Proceedings of the 1st Conference*, 1969, 4p

Presented at First Conference of the Canada Safety Council, Ottawa, 5-7 May 1969.

The Ontario regulations regarding school bus inspection are discussed.

Search terms: School bus safety; Vehicle inspection; Safety laws

5/4 Design**HS-009 351 Fld. 5/4****HEAT RESISTANCE CHARACTERISTICS OF PRIMARY WIRE INSULATIONS**

by Arlan D. Lewis

Essex International, Inc.

1971 9p
Report no. SAE-710094

Presented at Automobile Engineering Congress, Detroit, Mich., 11-15 Jan 1971.

Increasing automotive engine compartment temperatures have produced a need for more heat resistant insulations on primary wire. The heat problems with which insulations must cope are loss of resistance to cut through and deformation, loss of elongation over the long term, and an increase in the destructive effects of extended current overloads. A

pared through standard laboratory tests. Deformation and cut through resistance are shown through pinch test performance. Retention of elongation is demonstrated by both slab and wire tests after circulating air oven aging. Extreme current overload effects are compared by short circuit tests on mock harness assemblies.

Search terms: Heat resistance; Insulation; Wire; Deformation; Laboratory tests; Materials tests; Wear tests; Engine operating conditions; High temperature; Elasticity; Tensile strength; Short circuits

AVAILABILITY: SAE

HS-009 352 Fld. 5/4**SOME EFFECTS OF CURING CONDITIONS ON ADHESION TO METAL SURFACES**

by N. L. Rogers

Bell Helicopter Co.

1971 -6p 4 refs
Report no. SAE-710105

Presented at Automotive Engineering Congress, Detroit, Mich., 11-15 Jan 1971.

The effect of curing temperature on the peel strength of three different adhesive systems is reported. The adhesive systems were cured at 250 F, 275 F, 300 F, 325 F, and 350 F on aluminum, stainless steel, and titanium surfaces. The adhesives were also subjected to a single and a double cure cycle on four different aluminum alloys. Peel strength was determined at ambient temperature and at - 67 F.

Search terms: Curing; Adhesives; Aluminum alloys; Stainless steels; Titanium; Temperature; Peeling

AVAILABILITY: SAE

VEHICLE IMPACT ANALYSIS

by F. F. Timpner

Pontiac Motor Div.

[n.d.] 20p

A method is presented for evaluating the permissible impact velocity between two vehicles having different masses and different absorber capabilities. A method is shown for relating a pendulum velocity to equivalent barrier velocity for head-on impacts. A pendulum impacting the corner of a bumper is a different loading to the system than running the vehicle into a barrier at an angle. Corner impacts can reduce the energy absorbing capacity to 50% of head-on impacts and thus reduce the safe impact speeds by 30%. The results of the ideal square wave system assumed in the analysis can be adjusted to reflect actual absorber efficiencies and vehicle flexibility.

Search terms: Mathematical analysis; Equations; Impact velocity; Vehicle mass; Pendulum tests; Head on impact velocity; Impact angle

HS-009 354 Fld. 5/4**INTERNATIONAL DESIGN REVIEW: ENGINES**

by R. A. Wilson-Jones

Published in *Automobile Engineer* v60 n6 p200-10 (8 May 1970)

An era in which exhaust emissions are the major design problem is now beginning. The use of the V and Wankel engines is discussed. The basic configurations of engines are outlined. The general trend is toward the use of engines with larger displacements.

Search terms: Engine design; Wankel engines; V 8 engines; Automobile engines; Exhaust emission control; Engine size; Engine performance

VEHICLE SAFETY

HS-009 355 Fld. 5/4; 5/7

VEHICLE IMPACT ANALYSIS

by F. F. Timpner

Pontiac Motor Div.

6 Nov 1969 6p

The objective of this study was to determine the critical velocity relationships for two vehicles impacting each other. Equations are given for: car striking wall; two masses impacting; crush energy; maximum velocities for impact; special case of car hitting wall; special case of pendulum hitting car; and special case of two cars with same mass and same crush characteristics. An additional equation which will reduce to the case of the vehicle striking the wall is given. It will also define the pendulum striking a car, and it will provide for different mass cars with different amounts of crush.

Search terms: Impact velocity; Vehicle mass; Pendulum tests; Equations; Crush tests; Mathematical analysis; Barrier collision tests; Vehicle mass; Impact tests; Parked vehicles

5/5 Door Systems

HS-009 356 Fld. 5/5

COMPARISON OF DOOR OPENING FREQUENCY IN 1967-1968 AMERICAN MOTORS CORPORATION CARS WITH EARLIER MODEL CARS

by Roger B. Fargo

Published in *Automotive Crash Injury Bulletin* n10 8p (Oct 1969)

Data in this report indicate that there has been a progressive decrease in the frequency of door openings since the 1955 models. The higher frequency of door openings for American Motors vehicles, compared to other manufacturer's vehicles, may or may not represent a meaningful difference. The sample size is

small, and statistical significance of the differences in door opening frequencies is not demonstrated.

Search terms: Door hinge failures; Door opening accidents; Automobile models; American motor Co.; Data analysis

5/6 Fuel Systems

HS-009 357 Fld. 5/6

THE AMERICAN BOSCH MODEL 100 FUEL INJECTION PUMP

by Ross S. Karlson; Donald E. Valentine; Warren E. Snyder

American Bosch

1970 7p

Report no. SAE-700696

Presented at Combined National Farm, Construction, and Industrial Machinery and Powerplant Meetings, Milwaukee, Wis., 14-17 Sep 1970.

The Model 100 pump is the latest in the American Bosch family of single plunger pumps. It is intended to serve both the present and the future medium horsepower, high speed diesel engine market. New and improved features include a pressure-balanced plunger in the hydraulic head, a new constant phase servo lock internal timing device, and an Oldham plunger drive. The pump includes an excess fuel device for improved starting. Available accessories include an electric or Bowden wire shutoff, single lever control including mechanical shutoff, manifold pressure-actuated smoke limiting device, and tachometer drive take-off provision.

Search terms: Diesel engines; Fuel pumps; Fuel injection; Starting; Smoke; Tachometers

AVAILABILITY: SAE

HSL No. 71-20

HS-009 358 Fld. 5/6

HEAT CAPACITY CHANGES PREDICT NITROGEN OXIDES REDUCTION BY EXHAUST GAS RECIRCULATION

by S. Ohgishi; H. Kuroda; Y. Nakajima; Y. Hayashi; K. Sugihara

Kyoto Univ.; Nissan Motor Co., Ltd.

1971 11p 6 refs

Report no. SAE-710010

Presented at Automotive Engineering Congress, Detroit, Mich., 11-15 Jan 1971.

Earlier work has demonstrated that exhaust gas recirculation (EGR) decreases peak combustion temperature and thus reduces the concentration of nitrogen oxides (NO_x) in spark ignition engine exhaust. The present authors hypothesized that NO_x formation is primarily affected by the heat capacity of the combustion gases and recycled exhaust. The hypothesis was tested in an experimental program involving the admission of inert gases such as He, Ar, H_2 , and CO_2 , and water in place of EGR. In addition to confirming the validity of the original hypothesis, the test data also indicated that engine output and efficiency were significantly affected by the heat capacity of the combustion gases. The authors conclude that EGR functions by increasing the heat capacity of the working fluid, and demonstrates that the correlative changes in NO_x and engine performance can be predicted from heat capacity considerations. These studies, together with further work on combustion pressures, should be useful in evaluating various NO_x control techniques.

Search terms: Exhaust gas recirculation; Combustion; Temperature; Nitrogen oxides; Spark ignition engines; Exhaust emission control; Specific heat

AVAILABILITY: SAE

AN INVESTIGATION OF THE ADJUSTABLE ELEMENT CONCEPT FOR DESIGN OF AUTOMOTIVE EXHAUST MUFFLERS

by William S. Gately; Phillip S. Gegesky

Missouri Univ.; Army Tank-Automotive Command

1971 10p 12 refs
Report no. SAE-710166

Presented at Automotive Engineering Congress, Detroit, Mich., 11-15 Jan 1971.

The feasibility of employing a muffler with adjustable internal elements as an aid for design of production automotive exhaust mufflers is discussed. Design and internal geometry of the muffler are described. Equipment and methods for measuring the acoustic reflection and transmission characteristics of the muffler for various adjustments and pure tone frequencies are presented. Results are analyzed and compared with performance data obtained when the source of sound is simulated engine exhaust noise. The value of the adjustable element concept for design of automotive mufflers and the relative merits of pure tone and exhaust spectrum analysis are discussed. It is concluded that the adjustable element concept is a useful aid for exhaust system design.

Search terms: Mufflers; Exhaust noise; Exhaust systems; Laboratory tests; Acoustic measurement; Performance characteristics

AVAILABILITY: SAE

HS-009 360 Fld. 5/6

AIR QUALITY CRITERIA FOR HYDROCARBONS

National Air Pollution Control Administration

Mar 1970 126p refs
Report no. AP-64

tion products, particularly aldehydes, that are associated with the manifestations of photochemical air pollution. The chemical and physical characteristics of hydrocarbons and their degradation products are reviewed. Basic analytical methods used for measuring the atmospheric content of these compounds are discussed. The chemistry of hydrocarbon reactions in the atmosphere is briefly reviewed. The direct effects of hydrocarbons, essentially limited to vegetation damage from ethylene, are discussed. Toxicological data on hydrocarbons and aldehydes are also included.

Search terms: Air quality standards; Air pollution; Air pollutants; Hydrocarbons; Aldehydes; Photochemical reactions; Smog; Air pollutant concentration standards; Measuring instruments; Air pollution effects on trees and plants; Ethylene; Toxicology; Oxidation; Plant injuries; Air pollution effect on health

AVAILABILITY: GPO \$1.25

HS-009 361 Fld. 5/6

VEHICLE EMISSIONS VS. FUEL COMPOSITION. API-BUREAU OF MINES - PT. 2

by R. K. Stone; B. H. Eccleston

Chevron Research Co.; Bureau of Mines; American Petroleum Inst.

1969 36p 15 refs
Report no. Preprint-41-69

Presented at the 34th Midyear Meeting of the American Petroleum Institute's Division of Refining, Chicago, 13 May 1969. Pt. 1 of this report was announced as HS-004 904.

The American Petroleum Institute and the U.S. Bureau of Mines cooperatively have studied the influence of fuel volatility and front-end olefin on vehicular exhaust and fuel system emissions. Ex-

periments were conducted on engines of which there were broad differences in engine size, vehicle weight, and fuel systems. Six different gasolines were tested. Both exhaust and evaporative emissions, including hot soak losses, were measured in operating the vehicles on an all-weather chassis dynamometer to simulate city driving at four temperatures ranging from 20-95°F. Additional to the measurement of hydrocarbon concentration and composition, photochemical behavior of the emissions was studied using a laboratory photo-irradiation (smog) chamber. Results showed that volatility reduction reduced both the quantitative total of exhaust and evaporative losses and the photochemical effect from these emissions. Replacing the olefin in the front end of the fuel with no change in volatility did not change the quantity of total hydrocarbon emissions but did reduce the photochemical effect of these emissions. The reduction in photochemical effect by olefin replacement was greater than the reduction from lowering fuel volatility to the lowest level considered in this study.

Search terms: Fuel volatility; Olefins; Emission control; Hydrocarbons; Smog; Exhaust emissions; Evaporative emissions; Emission tests; Fuel composition; Carbon monoxide; Nitrogen oxides; Aldehydes; Evaporative emission measurement; Exhaust emissions measurement

5/9 Inspection

HS-009 362 Fld. 5/9; 5/17

SELECTED SAFETY ROAD CHECKS, MOTOR CARRIERS OF PROPERTY, FISCAL YEAR 1969

Bureau of Motor Carrier Safety

1966 19p

During the first six months of calendar year 1969 the field staff of the Bureau of Motor Carrier Safety inspected 24,233 property-carrying motor vehicles, bringing the total number checked in the

5/9 Inspection (Cont'd.)

HS-009 362 (Cont'd.)

1969 fiscal year to 49,502. Of these 11,507 or 23.2% were found to be mechanically unsafe for continued operation and were ordered out of service at the point of inspection until essential repairs had been completed. Vehicles chosen for inspection were those which did not appear well maintained, so are not a probability sample of all commercial vehicles. Statistics on the types of defects are included.

Search terms: Vehicle inspection; Truck defects; Commercial vehicles; Motor carriers; Truck maintenance; Statistics; Inspection records

5/10 Lighting Systems

HS-009 363 Fld. 5/10

EFFECTIVENESS OF OLD, NEW AND FUTURE MOTOR-CAR LIGHTING

by Kare Rumar

Uppsala Univ.

Published in HS-009 315; *International Study Week in Traffic and Safety Engineering* (10th), London, 1970

7p 20 refs

A paper on Theme 3: Recent developments in methods of improving night visibility.

Experiments carried out by the University of Uppsala Traffic Safety Research Group are described. The aim of the research is to try to adapt the lighting conditions in night driving to human visual characteristics. The problems investigated are: what visibility distances can be expected on a road when cars meet at night; what visibility distances do conventional and halogen headlights offer under perfect conditions; and what are the possibilities of developing and introducing a passing light system with considerably improved

effectiveness. Realistic and optimum visibility distances are discussed, and a new system for a polarized passing light is described.

Search terms: Night driving; Night vision; Night visibility; Sight distances; Headlamps; Low beamed headlamps; Polarized headlamps; Passing lamps

HS-009 364 Fld. 5/10; 3/12

POSSIBILITIES FOR POLARIZATION OF HEADLIGHTS

by Roger H. Hemion

Southwest Research Inst.

Published in HS-009 315; *International Study Week in Traffic and Safety Engineering* (10th), London, 1970

9p 7 refs

A paper on Theme 3: Recent developments in methods of improving night visibility.

A study was conducted of the interaction of critical parameters involved in driver performance and visibility in relation to headlight glare at night, including a determination of the usage of headlights by the motoring public throughout the United States. It was found that many drivers "overdrive" their headlights, driving too fast for conditions. Experimental and theoretical studies have confirmed the improvement in seeing which the use of polarized lighting could provide, but a large scale physical trial in normal traffic situations is needed to assess its operational limitations.

Search terms: Polarized headlamps; Headlamp glare; Speed patterns; Night vision; Night visibility; Headlamp usage; United States; Low beamed headlamps; High beamed headlamps; Sight distances; Driver performance

HS-009 365 Fld. 5/10

REQUIREMENTS FOR AUTOMOBILE EXTERIOR LIGHTING

by Rudolf G. Mortimer

Michigan Univ.

Published in HS-009 331; *Visual Factors in Transportation Systems*, 1969, p30-51

40 refs

Presented at Spring Meeting of NAS-NRC Committee on Vision, Washington, D. C., 1969.

Forward lighting systems could benefit from changes in beam configurations specifically designed to meet the performance requirements of driving conditions. The development of more efficient light sources, adaptive lighting systems, better manual or automatic headlamp aiming, as well as renewed interest in polarized headlighting suggest that improvements in forward lighting can be expected. Present indications are that a change from red taillights to green-blue could be beneficial. Separation of signal lights from taillights, besides improving driver response, could have particular advantages in fog conditions. Work is continuing with the evaluation of various taillighting configurations to provide information of relative velocity and closure with a leading vehicle.

Search terms: Headlamp design; Signal lamps; Running lamps; Tail-lamps; Speed indicators; Turn signals; Headlamp aiming; Following distance; Colored lamps; Gap utilization; Velocity perception; Red lamps; Blue green lamps

HS-009 366 Fld. 5/10; 3/12

SEEING AND SAFETY

by Merrill J. Allen

Published in *Analogy* n9 p13-7 (1970)

15 refs

in vehicle design are estimated to be capable of reducing our highway deaths to about 30% of what they are now, merely by preventing and reducing the severity of accidents.

Search terms: Vehicle visibility; Pedestrian visibility; Field of view; Vehicle design; Accident prevention; Injury prevention

5/13 Mirrors and Mountings

HS-009 367 Fld. 5/13

LOOKING AHEAD AT REAR VIEW MIRRORS

by Dorothy Aitkin

Published in *Fleet Owner* v65 n5 p54-61 (May 1970)

Review of: MOTOR VEHICLE REAR-VIEW VISION. FINAL REPORT. Dunlap and Associates, Inc. Aug 1969 209p 82 refs Contract FH-11-6951. Report numbers PB-186 228; HS-800 167.

This review of a report by Dunlap and Associates discuss rear view mirrors for trucks and passenger cars. The use of the convex mirror is reported. The possibilities for the periscope and fiber optics are presented.

Search terms: Rearview mirrors; Commercial vehicles; Automobiles; Convex mirrors; Periscopes; Fiber optics

5/18 Steering Control System

HS-009 368 Fld. 5/18

SUSPENSION AND STEERING

by Donald Bastow

Published in *Automobile Engineer* v60 n6 p217-31 (8 May 1970)

namely, front-wheel drive, front-wheel and link suspensions are increasing in popularity, but beam axles are used at the rear of several cars with front wheel drive. A new concept of power steering is being introduced by Citroen. Steering geometry and wheel bearings are also discussed.

Search terms: Rear suspension systems; Front suspension systems; Suspension systems; Front wheel drive automobiles; Rear axles; Power steering systems; Steering systems; Automobile models; Wheel bearings

HS-009 369 Fld. 5/18

A NEW ELASTOMERIC SUSPENSION SPRING

by Regis V. Schmitt; Matthew L. Kerr

Lord Manufacturing Co.

1971 8p

Report no. SAE-710058

This paper has examined the principle of using a constant frequency spring for consistent control of transmitted road disturbance with varying vehicle loads. The spherical elastomeric spring is shown to have constant frequency characteristics in a part which has been applied to a vehicle suspension. Field evaluations have shown that the spherical spring system provides a stable and consistent ride for an empty and loaded vehicle.

Search terms: Elastomers; Suspension systems; Springs; Frequencies; Vehicle riding qualities

AVAILABILITY: SAE

5/19 Theft Protection

HS-009 370 Fld. 5/19

A PLAN TO COMBAT NEW YORK'S AUTO THEFT. EIGHT

by Vincent L. Tofany

Published in *Analogy* n8 p4-11 (1970)

As part of an effort to combat theft of cars, New York State has developed the following approaches: special training to familiarize clerks who issue licenses with proper proof of ownership documentation and forged proofs; verification of previous ownership for both in state and out of state vehicles when processing registration applications; immediate access to a stolen car file containing VIN information; physical checks for any replacements of VINs, and computer applications for quick access to records.

Search terms: Theft; New York (State); Vehicle registration; Stolen vehicles; Computerized theft checks; Vehicle identification numbers

5/20 Trucks and Trailers

HS-009 371 Fld. 5/20

SNOWMOBILING — ITS INFLUENCE ON THE RESORTS

by Bob Palmer

Ontario Federation of Snowmobile Clubs

Published in HS-009 279; *Canada Safety Council, Proceedings of the 1st Conference*, 1969, 2p

Presented at First Conference of the Canada Safety Council, Ottawa, 5-7 May 1969.

The role of a snowmobile club in the safety snowmobile use is discussed. The relation of snowmobiling to the tourist dollar is mentioned.

Search terms: Snowmobiles; Tourism

HS-009 372 Fld. 5/20

**EVALUATION OF ORGANIZED
SNOWMOBILE RACING**

by Ross McMullen

Ontario Snowmobile Racing Federation

Published in HS-009 279, *Canada Safety Council, Proceedings of the 1st Conference*, Ottawa, 1969, 3p

Presented at First Conference of the Canada Safety Council, Ottawa, 5-7 May 1969.

Rules and regulations regarding snowmobile racing are discussed.

Search terms: Snowmobiles; Safety laws; Racing

HS-009 373 Fld. 5/20

SNOWMOBILING — LEGISLATIVE CONTROL

by A. M. Gartshore

Ontario Dept. of Transport

Published in HS-009 279; *Canada Safety Council, Proceedings of the 1st Conference*, 1969, 4p

Presented at First Conference of the Canada Safety Council, Ottawa, 5-7 May 1969.

Legislative control of snowmobiling is discussed in relation to: hazards; damage and vandalism to private property; noise; visibility; insurance; driver licensing; and minimum age for licensing.

Search terms: Snowmobiles; Safety laws

5/22 Wheel Systems

HS-009 374 Fld. 5/22

**PROCESSING 78-SERIES
BELTED TIRES**

by Mike Watson; Arden Faris

Published in *Modern Tire Dealer* v51 n11 p5, 7, 9-12 (June 1970)

Procedures and equipment for retreading are discussed particularly for the glass belted 78 series casings.

Search terms: Retreaded tires; Glass belted tires

HS-009 375 Fld. 5/22

CORDLESS CAST TIRE PERFORMS MUCH LIKE A RADIAL BELTED TYPE

by Glen Alliger

Published in *SAE Journal* v78 n5 p56-9 (May 1970)

Molding with high strength rubber produces a cordless tire with large cornering stiffness, low resonant frequency, a strong carcass, and commercially acceptable endurance.

Search terms: Cast tires; Cornering; Resonant frequency; Tire performance; Tire tests; Tire wear resistance; Cordless tires

HS-009 376 Fld. 5/22

DATA LOGGING OF VISCO-ELASTIC PROPERTIES OF RUBBER

by G. N. Lupton

England Road Research Lab.

1970 22p 6 refs
Report no. RRL-LR-330

A Wallace/Shawbury Dynamic Sinu-

soidal Strain machine fulfilling the test requirements laid down in BS903: Part A24: 1964 is being used by the Road Research Laboratory for research into the relation between viscoelastic properties of tire tread rubbers and the friction between tire and road surfaces. A number of modifications have been carried out on the machine for research purposes to provide more accurate data more easily and to extend the range of use of the machine. The modifications consist of: automatic control of temperature to 0.5°C; increase of the frequency range by one decade by use of a 9:1 or 1:1 reduction gear box; the use of Digital Transfer Function Analyser (T.F.A.) which can carry out measurements of stress and phase angle within the first 20 cycles of oscillation over most of the range of the machine and particularly at low signal strengths (0.1% strain) and frequencies below 2Hz. The accuracy in measuring 70% of the values of complex modulus is about $\pm 4\%$ and for the phase angle $\pm 0.3^\circ$ at 4% strain; computation of the data by punching the T.F.A. display onto 8 hole paper tape for analysis by an I.C.L. System 4-70 computer.

Search terms: Viscoelasticity; Tire treads; Tire tests; Rubber; Test equipment; Temperature; Computerized test methods; Dynamic tests; Sinusoidal vibration tolerances; Data processing; Shear stress; Frequencies; Tire road contact forces; Strain (Mechanics)

HS-009 377 Fld. 5/22

**NEW CORD BATTLE BREWING?
GLASS VERSUS WIRE**

by Ralph F. Wolf

Published in *Rubber Age* v102 n5 p72-8 (May 1970)

4 refs

The increased use of wire for tire cord is predicted. Properties of fiber glass and steel wire are compared. Activities of tire manufacturers are discussed in regard to steel wire for tire belting.

Glass belted tires; Tire cutouts; Tire cord tests; Tire properties; Fiberglass

NHTSA DOCUMENTS

NHTSA Accident Investigation Reports

HS-600 468 Fld. 1/5

MULTIDISCIPLINARY ACCIDENT INVESTIGATION SUMMARIES. VOL. 2, NO. 1

National Highway Traffic Safety Administration

Feb 1971 392p

In-depth studies of highway crashes are being conducted to identify contributing factors and injury causation, to evaluate the effectiveness of countermeasures, and to detect design and functional problems of the vehicle and the highway. Summaries of 89 case reports are given.

Search terms: Accident case reports; Multidisciplinary teams; Accident investigation; Accident factors; Accident causes; Accident prevention; Injury causes; Injury factors; Time of accidents; Environmental factors; Accident types; Precrash phase; Crash phase; Postcrash phase; Accident location; Vehicle design; Highway design

AVAILABILITY: NTIS

NHTSA CONTRACTORS REPORTS

HS-800 465 Fld. 5/18

STATE-OF-THE-ART DEFINITION OF VEHICLE HANDLING. FINAL REPORT. VOL. 1. PERFORMANCE SUMMARIES AND RECOMMENDATIONS

by J. McKibben; C. Gray; K. Niemiec

Digitek Corp.

Apr 1970 175p
Contract FH-11-7315

An extensive automotive test program was conducted to define the state of the art of vehicle handling for application to the development program of the experimental safety vehicle. The methodology employed to satisfy the program objectives and the summary results are discussed. Areas of performance covered include braking, acceleration and power output, steering, and general handling. Accident avoidance specifications in these areas are recommended for the experimental safety vehicle family sedan. The testing was done with six 1969 model cars which represented a sampling of current passenger car handling performance.

Search terms: Experimental vehicles; Safety cars; Vehicle handling; State of the art studies; Braking; Acceleration; Automobile power; Steering; Accident avoidance; Specifications; Automobile tests; Performance tests

AVAILABILITY: NTIS

HS-800 466 Fld. 5/18

STATE OF THE ART DEFINITION OF VEHICLE HANDLING. FINAL REPORT. VOL. 2. APPENDICES

by J. McKibben; C. Gray; K. Niemiec

Digitek Corp.

Apr 1970 472p
Contract FH-11-7315
Report no. DARD-1

An extensive automotive test program was conducted to define the state of the art of vehicle handling for application to the development program of the experimental safety vehicle. This volume contains four appendices which describe the test vehicles, the test facilities, and the test plans. All of the reduced data are presented in the form of tables.

Search terms: Experimental vehicles;

the art studies; Test facilities; Instrumented vehicles; Automobile tests; Performance tests; Test tracks; Braking; Acceleration; Steering; Test equipment; Vehicle control; Vehicle stability

AVAILABILITY: NTIS

HS-800 473 Fld. 5/5

TEST PROCEDURES AND REQUIREMENTS FOR DOOR SYSTEM EVALUATION. FINAL REPORT

by Edward S. Dale; Lynn D. Seal

Brown (Dayton T.), Inc.

31 Mar 1971 64p 5 refs
Contract DOT-HS-005-1-005
Report no. DTB22P70-1540

This report presents methods and describes test equipment utilized in conducting static load tests on automobile door systems and the conclusions derived from the tests. The purpose was to determine minimum strength and performance requirements in order to minimize occupant injuries caused by failure of the adjacent door or opposite door under crash conditions and to reduce the likelihood of occupant injuries caused by ejection.

Search terms: Door systems; Door system failures; Ejection caused injuries; Injury prevention; Crash phase; Test equipment; Static loads; Static tests; Automobile safety standards; Performance tests

AVAILABILITY: NTIS

HS-800 495 Fld. 1/1

HELICOPTER AMBULANCE SERVICE TO EMERGENCIES. "PROJECT HASTE" FINAL REPORT

Metropolitan Inter-County Council; Minnesota Dept. of Health

NHTSA Contractors Reports
(Cont'd.)

HS-800 495 (Cont'd.)

31 Mar 1971 159p

Contract FH-11-7128

Appendix 3 includes: Final Report on
a Radio Communication System for
Project HASTE by John R. DuBois.

Project HASTE was conceived to bring
highly trained emergency medical service
personnel to the scene of a personal

injury accident as quickly as practical
and to transport the critically injured to
hospitals by helicopter if time was of the
essence. Eight counties comprising the
metropolitan area of St. Paul-
Minneapolis participated in the project.
It was concluded that helicopter ambu-
lance service in a large metropolitan area
is not feasible because of operational
limitations but would be reasonable in
outlying areas where ground ambulances
cannot respond so quickly and where
transferring patients to a larger hospital

would be beneficial. Even in outlying
areas the helicopters would have to have
multi-purpose use to be economically
feasible.

Search terms: Helicopter ambulances;
Emergency medical services; Time
factors; Urban areas; Hospitals;
Economic factors; St. Paul; Minnea-
polis; Rural areas; Injury severity

AVAILABILITY: NTIS



executive summary

SYNOPSIS OF A RECENTLY RELEASED NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION RESEARCH REPORT

PROJECT METER

Project METER was initiated in April 1968 by the Washington State Department of Motor Vehicles. METER is the acronym for Machine Examination Teaching, Evaluation, and Re-education.

The primary objective of the project was to investigate the feasibility of an automated testing approach utilizing materials and expertise from three areas: programmed testing and learning, driving simulation, and driver examination and evaluation.

Contract No. FH-11-6834
State of Washington,
Department of Motor Vehicles
Olympia, Washington 98501
DOT/HS-800 462

Award Amount: \$360,000.00
Date Report Due: 1/30/70
Date Report Rec'd: 4/1/71
Release Date: 5/11/71

SUMMARY AND CONCLUSIONS

To accomplish the above objective, the investigators addressed themselves to the following:

1. Constructing road rules knowledge and driving performance tests.
2. Acquiring the automated testing hardware.
3. Evaluating the tests.
4. Evaluating the hardware.
5. Evaluating the METER system.

METER was a centralized system composed of three different testing subsystems: (1) individual knowledge testing sub-system; (2) group knowledge testing sub-system; (3) defensive driving testing sub-system utilizing a driving simulator. Each of the three sub-systems was interfaced with a central computer to enable one license examiner to operate the entire system and to provide for common data collection.

The testing hardware acquired for this project included (1) a two-car unit driving simulator, (2) four individual knowledge testing machines, (3) a 32 place group testing unit, (4) a central computer to operate the system and evaluate the data.

The operational evaluation of the meter program

demonstrated that the centralized systems approach was unsatisfactory and that separate, stand-alone testing systems should be utilized whenever possible. In addition, the group testing system (COPE) proved unsatisfactory as a testing system because of the administrative problems it created. A stand-alone individual knowledge testing system was determined operationally favorable.

The evaluation of the METER software items demonstrated that both the defensive driving test (using the driving simulator) and the knowledge test (using the individual testing machine) were capable of discriminating between drivers with good and poor driving records. However, most of the variables were negatively correlated. The negative correlations of the knowledge test have little impact in terms of driver examining since the present role of examining is to guarantee minimum level of knowledge and skills. However, the tests do indicate that some of the skills and knowledge tested for in traditional driver exams appear to be negatively related to driver performance as measured by a driving record accumulated over a three-year period.

The correlation of driving record and simulator test scores were strong and statistically significant. A significant positive correlation was attained for the

variable dangerous situations missed and three of the four accelerator oriented variables, while negative correlations were obtained for most variables that would indicate skill in manipulating a motor vehicle. The major weakness of the driving simulator was its inability to test a driver's ability to demonstrate such skills as parking, backing, and checking traffic at intersections. However, the investigators also concluded that as the state of the art of film and simulator testing improves, along with achieving greater similarities among States' licensing laws and the State's driver education requirements, the greater will be the potential for replacing the road test with film tests and driving simulators, especially as the retesting of licensed drivers becomes a reality.

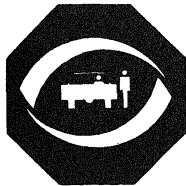
Finally, because the evaluation of the simulator system

was limited, due to the intermittent interface difficulties, the investigators concluded that additional research is needed based on an operational system to evaluate such a system in terms of operational effectiveness.

The Contract Manager has certified that the contractor's work has been satisfactorily completed and that all contractual obligations have been met.

The opinions, findings, and conclusions expressed in this summary are those of the contractor and not necessarily those of NHTSA.

Availability: The report may be ordered in paper copy (PC) or microfiche (MF) from NTIS; Order DOT/HS-800-462.



executive summary

SYNOPSIS OF A RECENTLY RELEASED NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION RESEARCH REPORT

VEHICLES IN USE, AND STATE COMPULSION VEHICLE INSPECTION

The purpose of this project was to determine the status of vehicles in use and to determine to what extent data from state compulsory inspection facility are available; also, to collect data concerning the reasons for rejection of vehicles presented for inspection at the Automobile Club's State inspection facility and compare the results for vehicles which had not been previously inspected with those vehicles which had been examined. Further purpose was to assess the relative worth of the platform type of brake tester, commonly used for state inspection, and the high speed roller tester.

Contract FH-11-7330
Automobile Club of Missouri
3917 Lindell Boulevard
St. Louis, Missouri 63108

Award Amount: \$50,974.00
Date Report Due : 7/31/70
Date Report Rec'd : 8/6/70
Release Date: 12/7/70

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GENERAL INFORMATION

The purposes of the three tasks described in the report are somewhat similar. They were designed to increase the data base of the National Highway Traffic Safety Administration and help in establishing a set of standards, setting Periodic Motor Vehicle Inspection (PMVI) methods and procedures. In a narrower sense, however, the specific purposes of each task are sufficiently different to call for detail comments found in the report.

Before it could be established what the nature of periodic motor vehicle inspections were needed for, it was necessary to learn what condition the vehicles of various ages and makes were likely to be in without a more stringent inspection. There is very little such data available. What information is on hand is frequently diluted by the fact that it was gathered by commercial establishments for other purposes. This

contract was intended to supplement the data generated in an earlier contract (FH-11-6915), to provide a broader data base, because a greater number of vehicles would be involved. The information gathered by the Clinic is presented in three main forms. Tables are provided which list the fourteen categories. Each category represents a system or sub-system of the automobile, for example, brakes. The second method of presentation consists of defining the ten most common defects. One table presents the ten most common defects which were present in the complete sample and other tables show these same ten, broken down by make and by age. The third means of presentation is by make, model and age of the vehicle at the time it was presented for inspection, all defects discovered by the Clinic, together with the means of all the variables measured and the standard deviations calculated by the computer.

The data gathered by the Club's periodic motor vehicle inspection facility was intended primarily to show whether there is a marked difference in the condition of vehicles which had not been previously presented for periodic inspection and those which had been previously inspected. The data is divided into two major categories and it will be noted in the report that the rejection rate is 50% higher for vehicles which had not been previously inspected than for those which had been previously inspected.

The purpose for the above general information was merely to bring into view some of the highlights of the project. Conclusions and recommendations for the entire project follow.

MAJOR CONCLUSIONS AND RECOMMENDATIONS

There is no clearly defined pattern in which deterioration of a motor vehicle takes place.

Ball joint checking is an inconvenient and difficult business. Manufacturers have not agreed on a standard method of checking the clearance, nor is there any reliable, rapid and convenient device available, with which accurate measurements can be taken. As a consequence, most examinations are made "by eye", and in the more conscientious shops a measurement is taken on dubious equip-

ability to give unequivocal answers. Engine analyzers, for example, cannot give quick complete diagnoses, even in conjunction with dynamometers. It is sometimes necessary to dismantle an engine, or to carry out further prolonged tests before an ailment or a series of ailments can be accurately identified.

There are virtually no test devices available which will quickly diagnose troubles in automatic transmissions. It is possible with X-Y recorders to plot the shift points on some dynamometers. This does not give anything even approaching a complete diagnosis. The pressure checks which can be made are far too time consuming to do in the course of a normal diagnostic check, but this need not be the case. There is nothing to prevent the manufacturer grouping a series of quick-disconnect plugs in some accessible area, and standardizing the size and location of these, so that a diagnostician can quickly connect a series of gauges and follow a number of short checks through. While this may not be enough to identify all of the problems, it should be enough to establish whether or not there are problems.

The report forms of diagnostic clinics, whatever the type, are designed primarily for the purpose of informing the car owner what repairs are necessary and for assisting the operators of clinics who also offer repair services. The forms are not specifically intended for gathering data essential to establishing the condition of the car for statistical purposes. There may be a great deal more information than is needed for the latter purpose, but at the same time some items necessary for statistical data bank may not be included. There is also doubt as to whether such a data bank should include items such as, for example, tire pressure. Tire condition and tread wear pattern (e.g. under-inflation wear, toe-out wear, etc.) cannot be deduced from the pressure at any one moment. Not enough is known as yet to enable a firm decision to be made as to whether all such data is helpful, or if it merely complicates the process of data analysis and clouds the true issues.

There is no commercially available device designed to check the effectiveness of shock absorbers. It is still necessary to rely on visual examination to look for leaks and faulty rubber bushings, added to the time honored bounce test. In most cases it is fairly safe for the diagnostician to suggest to the car owner that, if the vehicle has covered more than 20,000 miles it is due for new shock absorbers, but

The normally available diagnostic equipment, instruments and methods are still limited in their

this is not by any manner of means an objective test procedure. The only damper testing devices which exist cannot be used when the dampers are still attached to the car and are in any case both expensive and time consuming to use.

The best front end machine available at present for the purpose of a diagnostic clinic is in the opinion of the contractor the Hunter F60. This can complete a set of front end measurements, (camber, caster and toe-in) in less than one minute. However, there is doubt in most operator's minds which of the two toe-in reading should be given the most attention. These two are the so-called dynamic toe and the computed toe. Dynamic toe is usually close to the reading obtained using static toe-in measuring devices with a spreader bar to eliminate any play in the steering linkage. The computed toe reading on the other hand is likely to resemble more closely the toe-in reading from a static machine without the use of a spreader bar. Most vehicle manufacturers do not specify whether they expect the front end man to use a spreader bar or not and they do not mention the use of a dynamic test machine. If a shop possessed both a static and a dynamic machine for measuring front end angles and also had a spreader bar, there would be no way for them to decide which of the several readings, which they would probably obtain from any one given car, they should use when deciding whether adjustments were needed or not in relation to the manufacturer's specification figures. The Hunter F60 machine has two gauges which read tire toe or play. It seems that some tires possess a built-in characteristic which results in a tendency to steer one way or the other. Despite the fact that this phenomenon has been known by Hunter for some time, no tire manufacturer has yet made public an answer to the problem of how to eliminate false readings because of it. Nor has any statement been made as to why such phenomenon exists in the first place. The computed toe reading consists

of an average between the forward running dynamic toe and the dynamic toe, when read with the wheels running in the reverse direction. Thus, if there is any play in the system it will be averaged out. However, the tire pull will not be averaged out and this may or may not result in false readings. Until more is known about the phenomenon of tire and pull and precisely what it means in terms of the desirable toe-in settings, intelligent conclusions can not be reached concerning the use of static and dynamic front end machines.

The Contract Manager has certified that the contractor's work has been satisfactorily completed and that all contractual obligations have been met.

The opinions, findings, and conclusions expressed in this summary are those of the contractor and not necessarily those of NHTSA.

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